

AMMUNITION QUICKLOAD PROGRAM

TOW Missile Rack

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ACKNOWLEDGEMENTS

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I. INTRODUCTION

The purpose of this report is to outline requirements for construction of a rack which can be used for storage of TOW missiles in congested areas. This rack reduces the safety hazard from an accidental event by preventing the mass detonation of all this 1.1 ammunition consistent with DOD explosives safety criteria.

II. BACKGROUND

Reference¹ is made to DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards¹ and AR 385-64, Ammunition and Explosives Safety Standards², which implements the Department of Defense Standards.

Quantity-distance (Q-D) criteria for storage of conventional ammunition are designed to provide an appropriate level of protection against blast and fragment hazards. Explosives safety distance tables prescribe necessary separations and specify maximum quantities of the various classes of explosives permitted in any one location. These tables reflect acceptable minimum criteria for storage and handling of explosives. Such criteria provide reasonable safety with specified limits compatible with the risks of accidental explosion. Both the DOD 6055.9-STD and the AR which implements this standard for Army installations and activities provide the opportunity for reduced hazard distances corresponding to reduced fragment and blast hazards, if it can indeed be demonstrated that the hazards are reduced. The burden of proof is upon the initiating activity to demonstrate an acceptable level of safety, however.

III. RATIONALE

The design of this storage rack was predicated upon the assumption that the rack should control fragment hazards and explosion size, limiting the maximum credible event to some small fraction of the total stores. The rack and sandbagging specified herein limits the maximum credible event to a detonation of less than 50 lbs (TNT equivalent). It also reduces the safe inhabited building distance to 740 ft for the front of the rack (+ 30° from door centerline) and 350 ft for the other sides as shown in figure 1.

IV. RACK DESCRIPTION

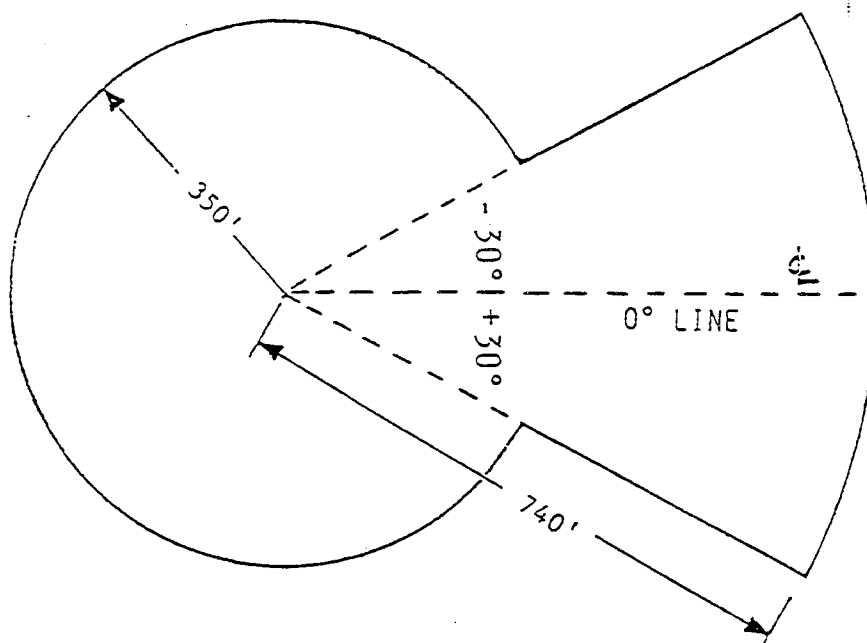
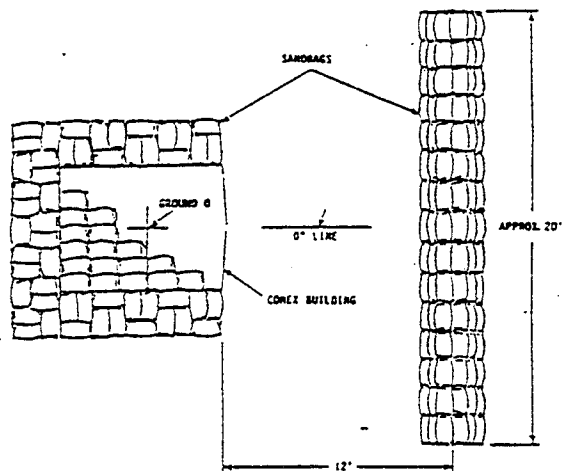
The TOW missile rack is designed such that it can be made to any size to suit a variety of storage situations. It is constructed of two types of components. The basic item is a stacking module and one is required for every TOW missile to be stored. The second component is a 1/4 inch thick steel plate which must be placed between each layer of missiles. Figures 2 and 3 show construction details of the stacking modules. Caution: The lumber used should be to the exact dimensions in the drawing. Any derivation could result in the missiles not fitting properly causing the protective shields to be improperly positioned defeating their purpose.

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1. DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards, July 84.
 2. AR 385-64, Ammunition and Explosive Safety Standards.

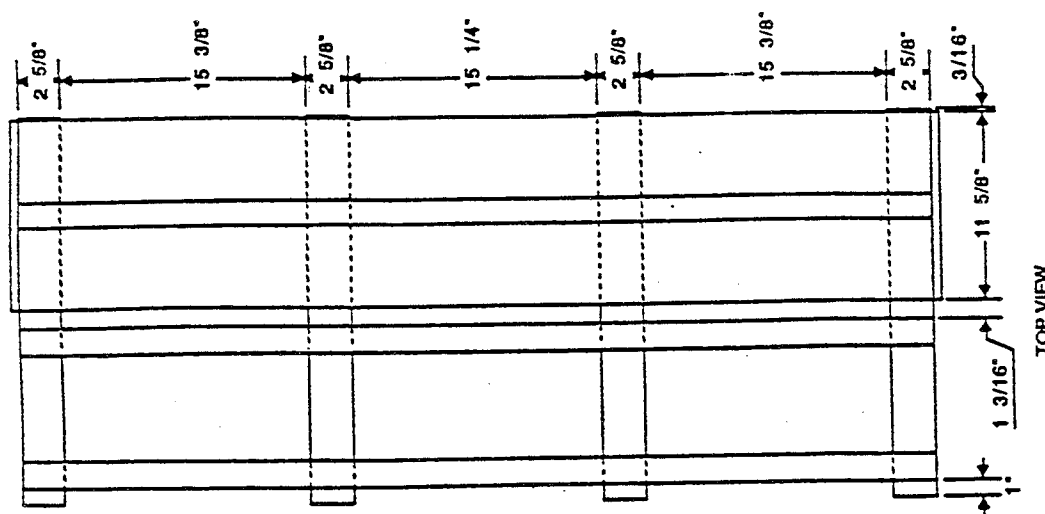
To store the TOW missiles, a stacking module is placed on the floor of a conex and a TOW missile is placed on the top runners of the stacking modules. This is repeated for the entire row so as that every TOW missile is separated by a 2x12 on the stacking module. A 57 1/2" x 72" x 1/4" steel plate is placed on top of the row and the next row is loaded the same way except the stacking modules are reversed so that no TOW missile is directly over another TOW missile. A steel plate is then placed on the second row and the third row is loaded identical to the first row. A partially loaded conex is shown in Figure 4 and the final loading configuration is illustrated in Figure 5. In order to keep the fragments within the corresponding distances noted (in the event of an accidental detonation), the conex container must be sandbagged. There must be a minimum of three layers of sandbags against the three walls and two layers on the roof. To minimize the kickouts and fragment distances in front of the conex, a sandbag barrier must be placed approximately twelve feet in front of the doors and be approximately 20 ft long. Stacking details of the sandbags can be seen in figures 6 and 7.

V. USE OF THE RACK

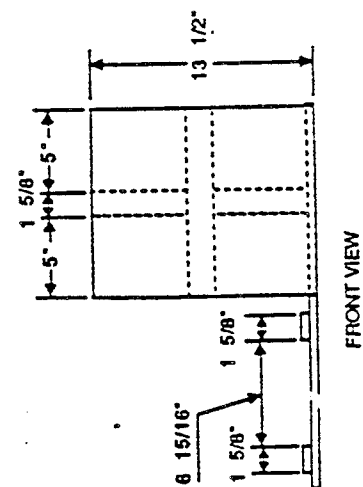
The rack may be used to assist in the storage of TOW missiles provided the rack is configured as described above, and located in excess of 740 ft from the nearest inhabited building. The TOW missiles must be stored in the original shipping boxes and placed in the racks, and express approval for siting is obtained from the DOD Explosive Safety Board.



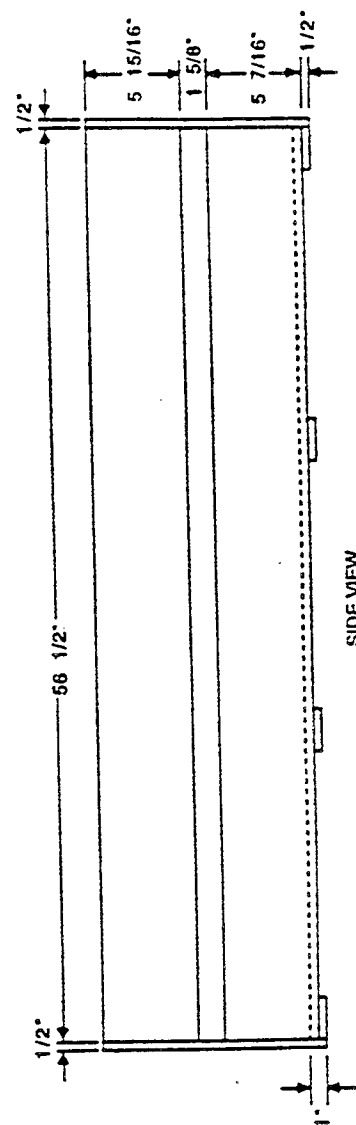
**TOW MISSILE
STACKING MODULE
(12" CONFIGURATION)**



TOP VIEW



FRONT VIEW



SIDE VIEW

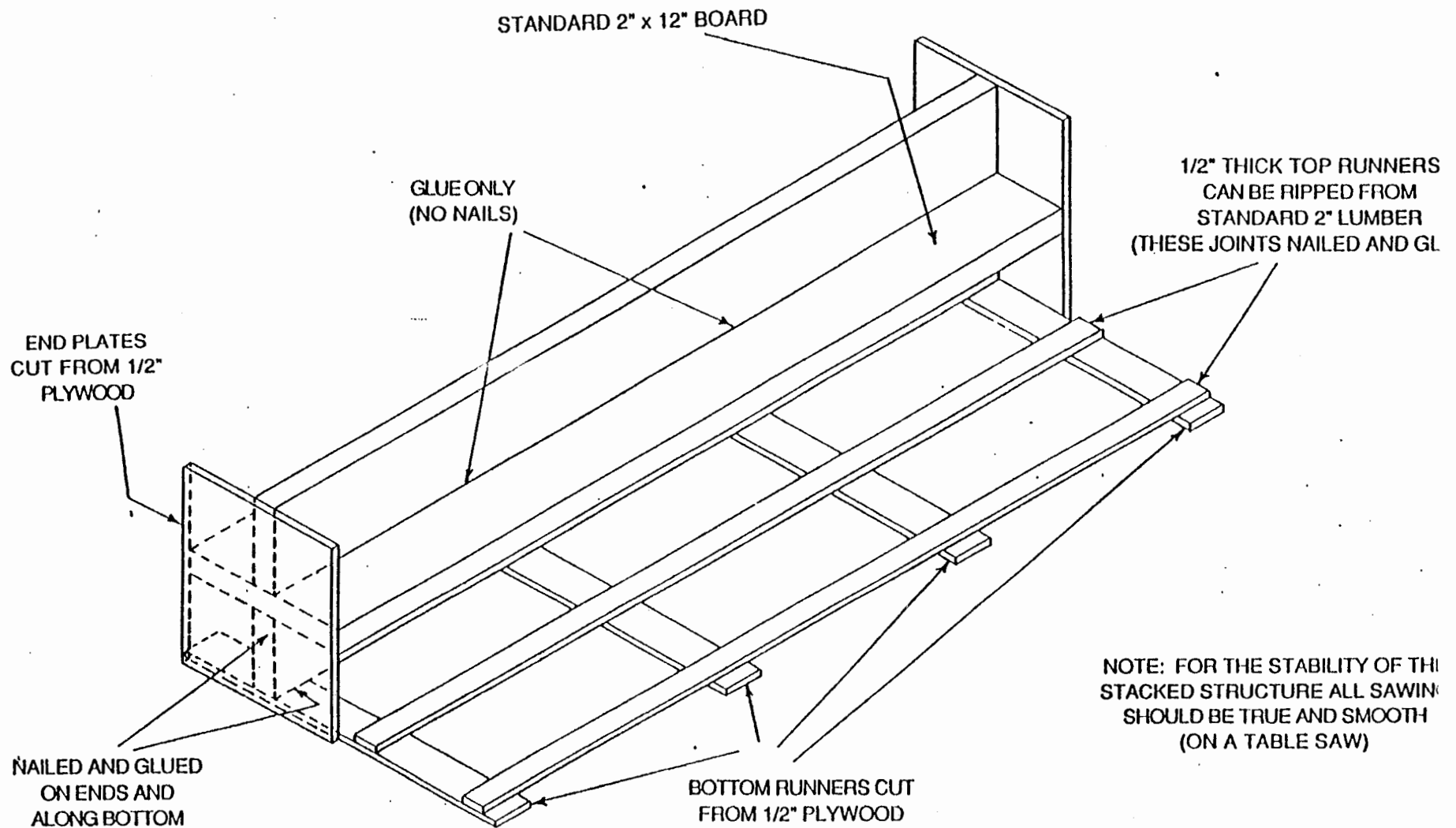


Figure 3

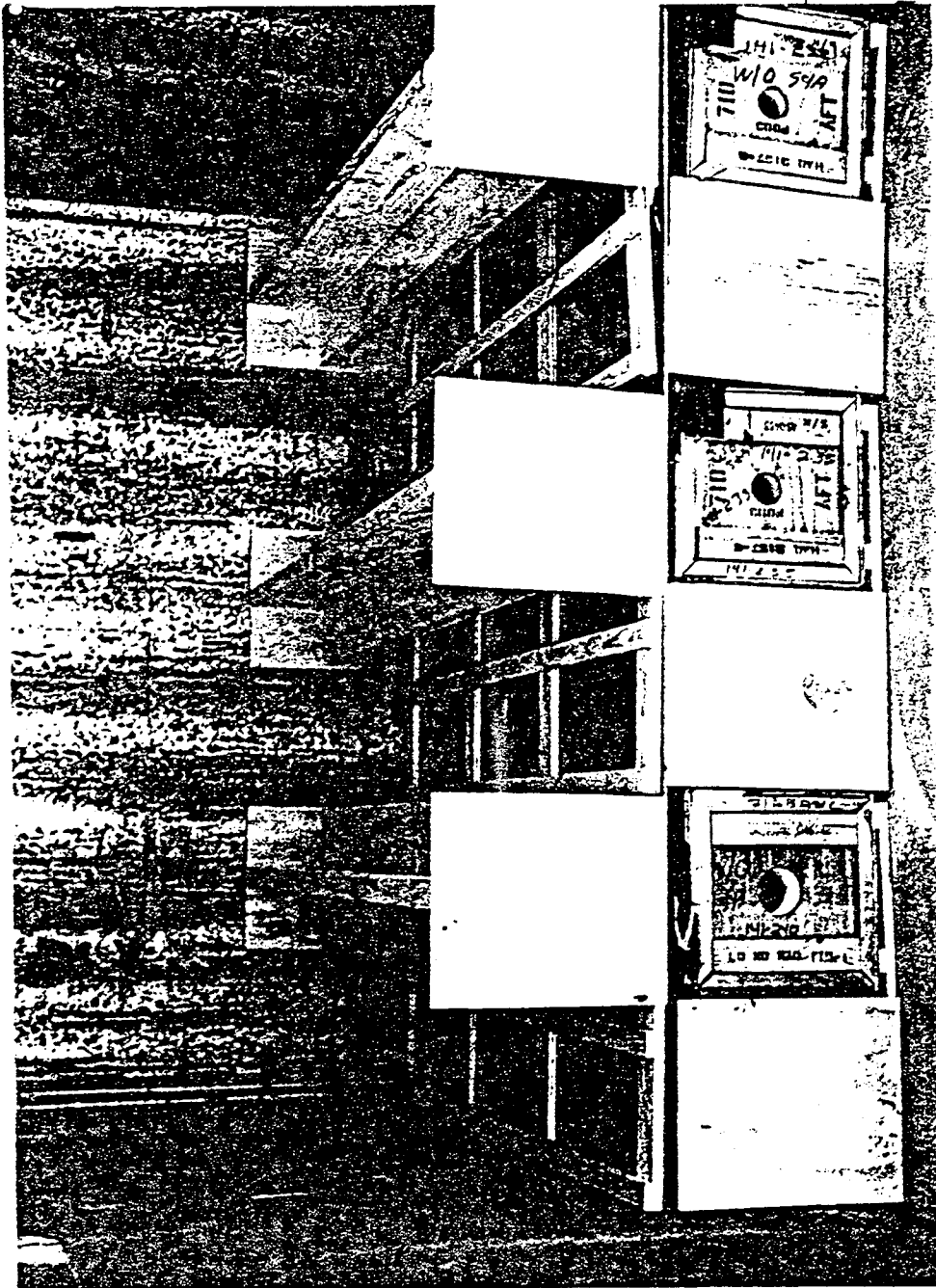


Figure 4

STOWAGE DIAGRAM
15 STACKING MODULES REQUIRED
(12" CONFIGURATION)

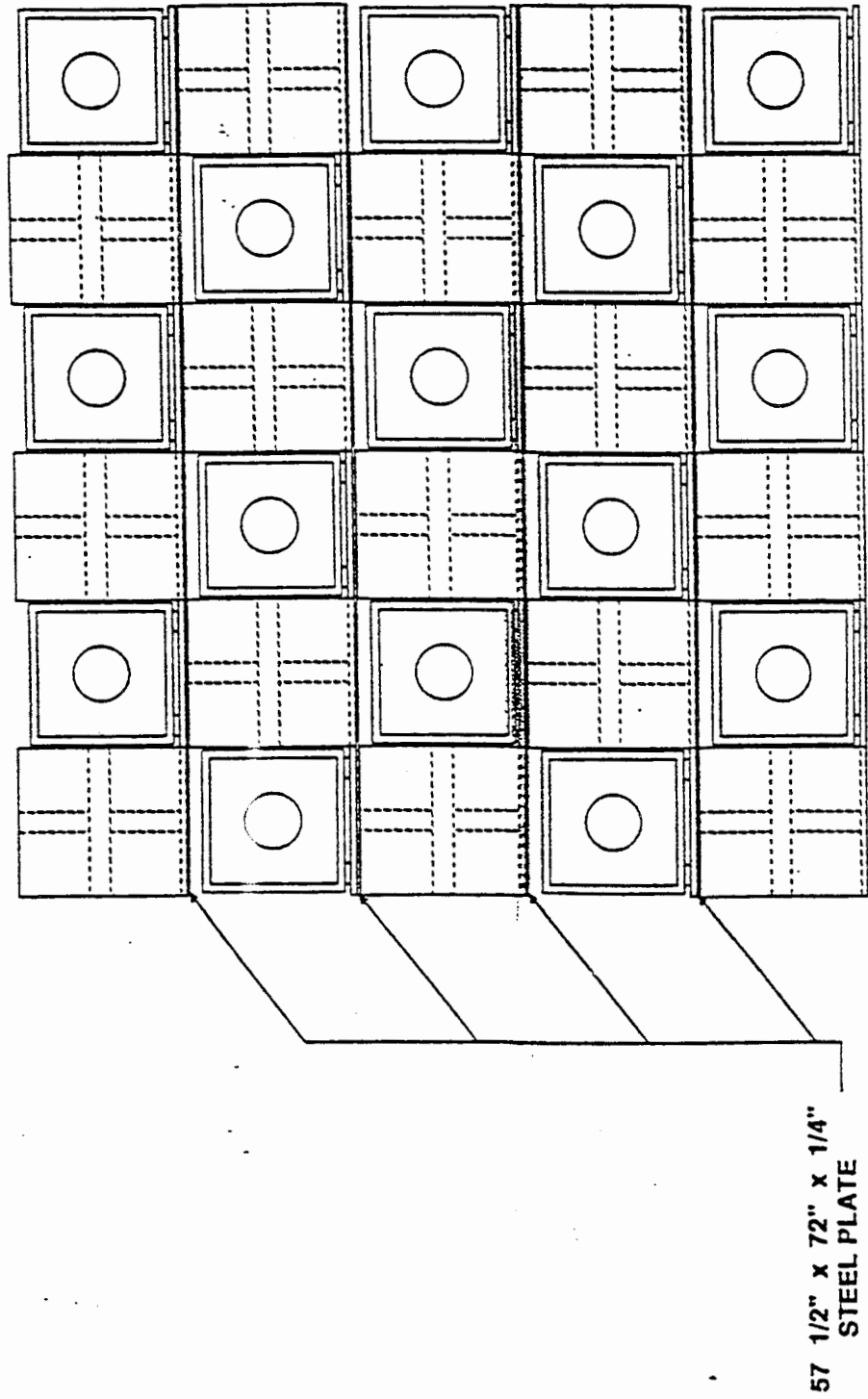


Figure 5

SANDBAG BARRICADE DETAIL / SANDBAG WALL BARRICADE DETAIL

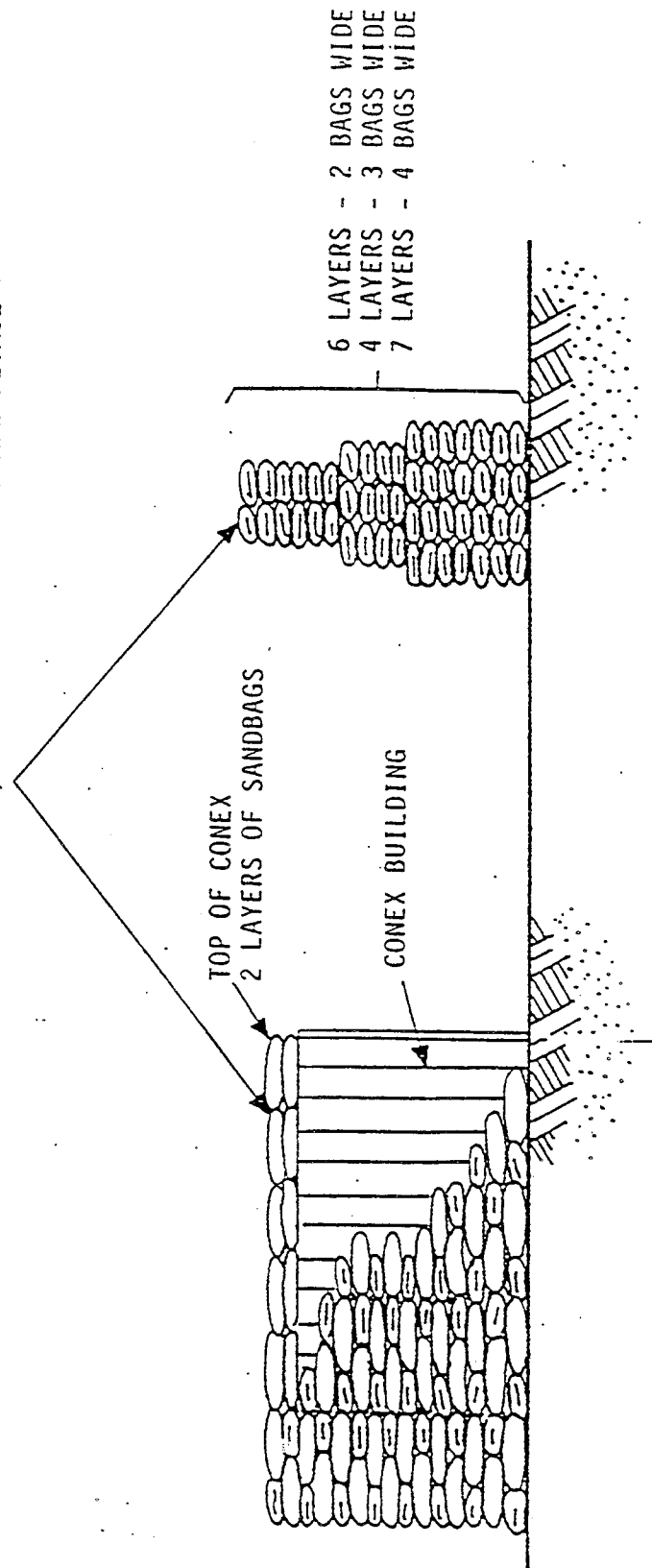


Figure 6

